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**VA Boston Healthcare System**

## NEWS RELEASE

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### **VA Study Challenges how to Detect Close Blast Brain Injuries**

**BOSTON** – When some people think of mild traumatic brain injury (TBI), or concussion, they think of someone getting “knocked out” or feeling “fuzzy” after getting hit in the head. Indeed, doctors use these very symptoms to diagnose a concussion. However, VA Boston Healthcare System (VA BHS) researchers from the Translational Research Center for TBI and Stress Disorders (TRACTS) published new findings that challenge the idea that brain injury only occurs when it produces changes in thinking ability at the time of the injury.

During an ongoing study, TRACTS researchers looked at Veterans who had been very close to at least one explosion while in service, such as roadside bombs. Their work revealed changes in the way different parts of the brain talk to each other in these Veterans compared to those who had never been as close to a blast. These changes were found in Veterans *whether or not* the blast produced symptoms of concussion, like being knocked unconscious or feelings of fuzziness. The most important factor was only that the Veteran was within 10 meters (about 30 feet) of the explosion. Blasts that occurred further away did not appear to result in brain changes.

The study, published in the journal “Human Brain Mapping,” used an advanced method of brain imaging called Functional Connectivity Magnetic Resonance Imaging (fcMRI). This method measures the movement of water and oxygen in the brain and allows researchers to measure how different areas of the brain communicate. The study showed that exposure to at least one blast at close range (10 meters or less) changed how much different areas of the brain communicated with each other. Closer blasts were related to less communication.

Meghan Robinson, PhD, the lead author on the paper, said “This finding is important because it shows that changes in brain activity may occur without obvious symptoms at the time of the injury. We don’t know yet if these brain changes cause problems with health or daily functioning but we plan to look into that next.” Ultimately, this work may change the way healthcare providers think about blasts and head trauma during military service, and how it relates to the care that Veterans need today and in the years to come.

TRACTS is an ongoing study that has enrolled over 400 Veterans of the Iraq and Afghanistan wars. All Veterans who take part in the study receive a thorough psychological and clinical interview, as well as advanced brain imaging using MRI. One of the interviews Veterans

participate in is the Boston Assessment of TBI-Lifetime (or BAT-L). The BAT-L is a new assessment tool that is a joint effort between TRACTS and the Neuropsychology and Polytrauma Services at VA BHS. It was designed specifically to study the unique circumstances by which military service members may sustain a head injury while in service. This includes a detailed assessment of blast exposure, and helps psychologists identify possible head injuries, including blast exposures that did not result in a concussion with symptoms. The BAT-L probes for these possible injuries across the Veteran's life. With this level of information available, Dr. Robinson and her colleagues were able to link blast exposures to brain changes, while ruling out other possible causes of those brain changes, such as posttraumatic stress disorder (PTSD), depression, and or substance abuse.

TRACTS collects many types of brain images in their study, so the researchers are hoping to use these to continue to reveal new information about other aspects of brain health and to learn more about how blast exposures may change the brain's function. Ultimately, they hope to find out how to treat these injuries, and with luck, how to prevent them from happening at all.

To read the article in the journal Human Brain Mapping titled "Close-Range Blast Exposure is Associated with Altered Functional Connectivity in Veterans Independent of Concussion Symptoms at Time of Exposure," go to the external link at:  
<http://onlinelibrary.wiley.com/doi/10.1002/hbm.22675/full>

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Photo caption:

BOSTON – From left, VA Researchers Randall Newmark, PhD, and Meghan Robinson, PhD, discuss how an MRI can help analyze changes in the way different parts of the brain communicate at the VA Boston Healthcare System's Jamaica Plain Campus November 19, 2014. The Translational Research Center for TBI and Stress Disorders (TRACTS), is conducting an ongoing study of Veterans who have been very close to at least one explosion while in service, such as roadside bombs. (VA photo by James C. Lally, Public Affairs Specialist, VISN1 Clinical Trials Network, VA Boston HCS)